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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/668,735 | 09/23/2003 | Ronald D. Provow | 58727US002 | 1778 |
| 32692 | 7590 | 06/14/2006 | EXAMINER | |
| 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427 | | | MARCHESCHI, MICHAEL A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1755 | |

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/668,735

Applicant(s)

PROVOW ET AL.

Examiner

Michael A. Marcheschi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,6-10,12,14-17,20,23-26,28 and 30-38 is/are pending in the application.
- 4a) Of the above claim(s) 6-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,10,12,14-17,20,23-26,28 and 30-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/5/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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The indicated allowability of claims 14, 15, 23, 24, 30, 31, 36 and 37 in the office action mailed 3/2/06 is withdrawn after further review of the specification, including the claims, and the new references directed to Skeem, which when applied in combination with the previous references, render obvious the instant claims for the reasons defined below.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 10, 12, 14-17, 20, 23-26, 28 and 30-38 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The binder, grinding aid and the abrasive particles, as defined on page 13, lines 24-26 are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Page 13, lines 24-26 states that "An essential step to make the abrasive article (feature) is the preparation of the slurry (mixing step). The slurry made by combining...a binder precursor, a grinding aid and abrasive particles."

With respect to the claims that define the abrasive feature and article (and use thereof), in view of the above statement, it is reasonably implied that the final abrasive feature (composite) must contain the essential components of "a binder, a *grinding aid* and abrasive particles". This is apparent because these components are essential components in the mixing of the slurry and

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thus the final feature will inherently contain said components, thus said components are essential components of the abrasive feature (essential components not listed in the claims).

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4, 10, 12, 14-17, 20, 23-26, 28 and 30-38 are rejected under 35 U.S.C. 103(a) as obvious over Hoopman (097) **in view of** Neff (099), Adefris et al. (108) and Skeem et al. (936) **alone or further** in view of Wei et al. (724).

The teachings according to Hoopman (097), Neff (099), Adefris et al. (108) and Wei et al. (724) are defined in the previous office action.

Skeem et al. (936) teaches in figure 3 and the description of said figure in column 4, lines 9-20 that abrading (cutting) features defining an angled face is known for optimizing the feature by creating a leading edge thus significantly reducing dulling of the feature. Figure 9 and the description of said figure in column 7, lines 13-20 define that abrading (cutting) features being rounded (radiused) at the junction between feature and substrate surface minimizes undercutting, thus protecting the abrasive grains.

The primary reference fails to teach (1) the positive rake angle (undercut) of the composites, (2) the abrasive particles on the surface of the planer top, (3) angled top surface and a radiused section. With respect to the rake angle (undercut), this limitation, however, is obvious to the skilled artisan because Neff et al. teaches that more aggressive rate removal applications require abrasive features (i.e. the cone according to the reference can broadly be considered an

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abrasive feature) with a positive rake angle to the base (i.e. the reference implies that a positive rake angle optimizes this application and provides a benefit of using a feature having a positive rake angle) and it is the examiners position that this would provide the necessary motivation to produce the shapes defined by the primary reference having a positive rake angle. One reading this secondary reference would understand that composites can be made with a positive rake angle (to the base) if the application desired was aggressive removal. In view of the above, clear motivation for the combination is apparent. To further support the examiners position, Adefris et al. clearly shows that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section). With respect to the angled surface, the primary reference states that the features can be any convenient shape and this broadly makes obvious the use of an angled top. This is apparent because one skilled in the art would be found it obvious to make the features with an angled top in view of the benefits of using an angled top feature defined by Skeem. With respect to the motivation, it is the examiners position that the benefits defined by Skeem provide the necessary motivation to produce the shapes defined by Hoopman (097) in view of Neff (099) and Adefris et al. (108) having an angled top. Although this reference is directed to teeth on a cutting article, it is the examiners position that one skilled in the art reading Skeem would understand, in view of the benefits defined, that the angled top is not only applicable to teeth but to any feature that is used in abrading operations. With respect to the abrasive particles provided on the planar top portion of the features, this limitation is obvious because it is the examiners position that this limitation would have been obvious to the skilled artisan in order to assist in removing material from the work piece. To support the examiners position, Wei et al., as defined above, clearly shows that the application of a functional powder

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(abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece). Although this reference does not specifically state that the functional powder is applied to the planar surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. With respect to the shape defined by claim 4 and the other claims corresponding to the same subject matter, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a point outside the base perimeter absent evidence to the contrary. With respect to claim 16, the arrangement of the features is well within the level of ordinary skill in order to maximize the abrasive performance. With respect to the undercut limitation, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a undercut section absent evidence to the contrary. With respect to the “radiused section” of 14, 15, 23, 24, 30, 31, 36 and 37, the application of a radiused section to the features defined above, would have been obvious in view of the benefits of using a radiused section at the junction between feature and substrate surface (minimizes undercutting, thus protecting the abrasive grains). With respect to the motivation, it is the examiners position that the benefits defined by Skeem provide the necessary motivation to produce the shapes having a radiused section as defined by the instant claims. Although this reference is directed to teeth on a cutting article, it is the examiners position that one skilled in the art reading Skeem would understand, in view of the benefits defined, that the radiused section is not only applicable to teeth but to any feature that is used in abrading operations. In addition the use of a radiused section will minimize the retention of swarf at the junction between feature and substrate surface, thus

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maximizes the continuous use of the article. In other words, with a radiused section, will function as a mechanism to eliminate swarf at said junction. With respect to the belt limitation and abrading method, the primary reference defines these. The limitations not addressed above are taught or implied by the references.

Claims 1, 4, 10, 12, 14-17, 20, 23-26, 28 and 30-38 are rejected under 35 U.S.C. 103(a) as obvious over Adefris et al. (108) in view of Hoopman (097) and Skeem et al. (936) **alone or further** in view of Wei et al. (724).

Adefris et al. shows in figure 1 (last abrasive feature shown-feature closest to numeral 14) that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section). The composites are attached to a backing (flexible-see column 4, line 56). The composites can be a truncated pyramid or a random shape (column 3, lines 57-59) and are made from an abrasive with a ceramic binder (see abstract).

The teachings of the other reference are previously defined.

Although the primary reference uses a ceramic to bond the abrasives together, it is the examiners position that the use of a polymer in place of the ceramic would have been well within the level of ordinary skill in the art because Hoopman teaches that polymeric binders are known for this purpose. Since both ceramics and polymeric binder are known for the same purpose (bond abrasive together to form abrasive composites as clearly shown by both reference), they can be considered functional equivalent materials for forming abrasive composites and the substitution of one functional material for another that is to be used for the same purpose is clearly within the scope of the skilled artisan. With respect to the rake angle (undercut), Adefris

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et al. clearly shows that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section). With respect to the angled surface, the primary reference states that the features can be any convenient shape and this broadly makes obvious the use of an angled top. This is apparent because one skilled in the art would be found it obvious to make the features with an angled top in view of the benefits of using an angled top feature defined by Skeem. With respect to the motivation, it is the examiners position that the benefits defined by Skeem provide the necessary motivation to produce the shapes defined by Adefris et al. (108) in view of Hoopman (097) having an angled top. Although this reference is directed to teeth on a cutting article, it is the examiners position that one skilled in the art reading Skeem would understand, in view of the benefits defined, that the angled top is not only applicable to teeth but to any feature that is used in abrading operations. With respect to the abrasive particles provided on the planar top portion of the features, the primary reference states that a size coating (one containing abrasive particles (silica)) can be applied to the composites (see column 11, line 30 and column 12, line 16), thus reading on this limitation. In the alternative, this limitation is obvious because it is the examiners position that this limitation would have been obvious to the skilled artisan in order to assist in removing material from the work piece. To support the examiners position, Wei et al., as defined above, clearly shows that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece)). Although this reference does not specifically state that the functional powder is applied to the planar surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. With respect to the shape defined by claim 4 and

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the other claims corresponding to the same subject matter, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a point outside the base perimeter absent evidence to the contrary. With respect to claim 16, the arrangement of the features is well within the level of ordinary skill in order to maximize the abrasive performance. With respect to the undercut limitation, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a undercut section absent evidence to the contrary. With respect to the “radiused section” of 14, 15, 23, 24, 30, 31, 36 and 37, the application of a radiused section to the features defined above, would have been obvious in view of the benefits of using a radiused section at the junction between feature and substrate surface (minimizes undercutting, thus protecting the abrasive grains). With respect to the motivation, it is the examiners position that the benefits defined by Skeem provide the necessary motivation to produce the shapes having a radiused section as defined by the instant claims. Although this reference is directed to teeth on a cutting article, it is the examiners position that one skilled in the art reading Skeem would understand, in view of the benefits defined, that the radiused section is not only applicable to teeth but to any feature that is used in abrading operations. In addition the use of a radiused section will minimize the retention of swarf at the junction between feature and substrate surface, thus maximizes the continuous use of the article. In other words, with a radiused section, will function as a mechanism to eliminate swarf at said junction. With respect to the belt limitation, the primary reference clearly discloses this (column 13, line 50). With respect to abrading a wood work piece, although not literally defined by the primary reference, this aspect is well within the scope of the skilled artisan because Hoopman teaches that wood work pieces are

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known to be abraded with abrasive articles. The limitations not addressed above are taught or implied by the references.

Claims 1, 4, 10, 12, 14-17, 20, 23-26, 28 and 30-33 are rejected under 35 U.S.C. 103(a) as obvious over Kaisaki et al. (317) in view of Skeem et al. (936) **alone or further** in view of Wei et al. (724).

The teachings according to the references are previously defined.

The primary reference fails to literally define a positive rake angle (undercut). The reference, however, teaches that the abrasive features are set forth to have a positive or negative taper and it is the examiners position that the teaching of this broadly makes obvious the claimed rake angle and undercut absent evidence to the contrary. With respect to the angled surface, the primary reference states that the features can be any convenient shape and this broadly makes obvious the use of an angled top. This is apparent because one skilled in the art would be found it obvious to make the features with an angled top in view of the benefits of using an angled top feature defined by Skeem. With respect to the motivation, it is the examiners position that the benefits defined by Skeem provide the necessary motivation to produce the shapes defined by the primary reference having an angled top. Although this reference is directed to teeth on a cutting article, it is the examiners position that one skilled in the art reading Skeem would understand, in view of the benefits defined, that the angled top is not only applicable to teeth but to any feature that is used in abrading operations. With respect to the abrasive particles provided on the planer top portion of the features, this limitation is obvious because it is the examiners position that this limitation would have been obvious to the skilled artisan in order to

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assist is removing material from the work piece. To support the examiners position, Wei et al., as defined above, clearly shows that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece)). Although this reference does not specifically state that the functional powder is applied to the planar surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. With respect to the shape defined by claim 4 and the other claims corresponding to the same subject matter, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a point outside the base perimeter absent evidence to the contrary. With respect to claim 16, the arrangement of the features is well within the level of ordinary skill in order to maximize the abrasive performance. In addition, the primary reference states that the features are defined in a predetermined pattern. With respect to the undercut limitation, the combined teachings above make a positive rake angle obvious in the primary reference and a feature with positive rake angle has a undercut section absent evidence to the contrary. With respect to the “radiused section” of 14, 15, 23, 24, 30 and 31, the application of a radiused section to the features defined above, would have been obvious in view of the benefits of using a radiused section at the junction between feature and substrate surface (minimizes undercutting, thus protecting the abrasive grains). With respect to the motivation, it is the examiners position that the benefits defined by Skeem provide the necessary motivation to produce the shapes having a radiused section as defined by the instant claims. Although this reference is directed to teeth on a cutting article, it is the examiners position that one skilled in the art reading Skeem would understand, in

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view of the benefits defined, that the radiused section is not only applicable to teeth but to any feature that is used in abrading operations. In addition the use of a radiused section will minimize the retention of swarf at the junction between feature and substrate surface, thus maximizes the continuous use of the article. In other words, with a radiused section, will function as a mechanism to eliminate swarf at said junction. With respect to the belt limitation, the primary reference defines these. The limitations not addressed above are taught or implied by the references.

Claims 34-38 are rejected under 35 U.S.C. 103(a) as obvious over Kaisaki et al. (317) in view of Skeem et al. (936) **alone or further** in view of Wei et al. (724), as applied to claims 10 and 26 above and further in view of Hoopman (097).

Claims 10 and 26 define the abrasive articles used in claims 34 and 38, respectively.

With respect to the shape of the abrasive feature, this is defined in the previous rejection, the examiners statements which are incorporated herein by reference. With respect to abrading a wood work piece, although not literally defined by the primary reference, this aspect is well within the scope of the skilled artisan because Hoopman teaches that wood work pieces are known to be abraded with abrasive articles.

Applicant's arguments with respect to all the claims have been considered but are moot in view of the new ground(s) of rejection. Although new rejections have been made, the examiner will comment on applicants remarks as they pertains to any of the rejections above.

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With respect to Hoopman (097), as the primary reference, in view of Neff (099), the examiner completely responded to applicants remarks in the previous office action.

With respect to Adefris, applicants state that this reference does not use a polymeric binder. The examiner acknowledges this, however, this reference has been used to merely show that composites for abrasive articles are known to define a positive rake angle with respect to the base (undercut section), irrespective of what the feature is made of.

With respect to Wei, applicants arguments are based on the fact that this reference is not directed to the application of abrasive particles on a *top planar surface* of a composite. The examiner acknowledges this, however, this reference has been used to merely show that the application of a functional powder (abrasive) to the surface of structured abrasive modifies the abrasive qualities (i.e. assists in the abrasive cut (removal of material from a work piece). It was stated that although this reference does not specifically state that the functional powder is applied to the *planar* surface of abrasive composites, one skilled in the art would have appreciated the concept of using a functional powder to be applied to any abrasive structure. Applicants have not clearly addressed this reasoning.

Finally, any arguments based on the angled surface are moot in view of the new rejection above.

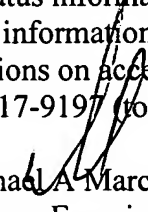
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Marcheschi whose telephone number is (571) 272-1374. The examiner can normally be reached on M-F (8:00-5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MM
2/06


Michael A. Marcheschi
Primary Examiner
Art Unit 1755